

SECTION 3.0

Coastal Salt Marsh Area Sites

Section 3.0 contains all of the information related to the Coastal Salt Marsh Area sites. This section is organized as follows:

3.1: Site Background and Extent of Contamination provides background information and discusses the nature of contamination for the sites in the Coastal Salt Marsh Area currently owned by the Army and also the sites in the adjacent coastal salt marsh habitat on property currently owned by the SLC. It provides a brief summary of the historical investigations and describes, in general terms, the nature of contamination found at the coastal salt marsh sites. In addition, it provides a background discussion for each site and identifies the nature of contamination.

3.2: Overview of Risk Assessment and Action Goals provides an overview of the risk assessment and the process used to establish action goals for the coastal salt marsh sites. It presents details of the process used to determine contaminants of potential concern (COPCs) and to establish action goals.

3.3: Remedial Action Objectives (RAOs) describes the goals that proposed remedial actions are expected to accomplish and the development of RAOs for the coastal salt marsh sites, and presents how the different agencies (DTSC, RWQCB, and Army) identify and implement their respective laws and standards for selection of remedies.

3.4: Summary and Evaluation of Alternatives summarizes the evaluation and selection of remedial alternatives presented for each coastal salt marsh site. It provides a description of the remedial alternatives, and the process for selecting alternatives for each site. The rationale for adopting the selected alternative is also provided.

Information for the Inboard Area sites is presented in Section 2.0.

SECTION 3.1

Site Background and Nature of Contamination

This section addresses the sites in the coastal salt marsh, currently owned by the Army, and the sites in the adjacent coastal salt marsh habitat, currently owned by the SLC. For ease of terminology, this section will use the term "coastal salt marsh" to refer to all areas outboard of the perimeter levee.

This section provides background information and discusses the nature of contamination for each site in the coastal salt marsh. Subsection 3.1.1 briefly summarizes the historical investigations and describes, in general terms, the nature of contamination found at the coastal salt marsh sites. Subsection 3.1.2 identifies the sites in the coastal salt marsh that are addressed in this ROD/RAP. Subsection 3.1.3 provides background information for each site and identifies the nature of contamination and COPCs.

3.1.1 Historical Investigations and Nature of Contamination

Numerous activities were conducted in the coastal salt marsh between 1987 and 2002. Historical activities included a confirmation study for hazardous waste, remedial investigations, biological testing data studies, and a HHERA. The following documents summarize the findings of these activities:

- *Coastal Salt Marsh December 2001/January 2002 Sampling Report* (USACE, 2002b): The Army collected additional soil samples at the coastal salt marsh sites to further characterize and investigate the extent of chemicals detected in the previous investigations, with the exception of the High Marsh Proposed Channel Cut and the Boat Dock Nonchannel Area.
- *Draft Channel Cut Sampling Report, Coastal Salt Marsh* (USACE, 2002a): The Army conducted this specific investigation to evaluate the soil in the High Marsh Proposed Channel Cut.
- *Human Health and Ecological Risk Assessment* (USACE, 2001): An HHERA was completed for the coastal salt marsh sites.
- *Remedial Design Investigation Report* (FW, 2000): A design data report was completed following the RI for the Antenna Debris Disposal Area and Boat Dock.
- *Comprehensive Remedial Investigation* (IT, 1999a): Coastal salt marsh sites were investigated during the RI, which consisted of collecting and analyzing soil, sediment, and water samples to determine whether the sites were affected by past activities. The RI activities ranged from review and evaluation of previous investigation data to the collection of soil, sediment, and groundwater samples for analysis. During the RI, additional background data were collected for metals. These data were combined with background data collected in previous investigations and were used to determine baseline (or background) concentrations for metals and PAHs in sediment and soil.

- *Biological Testing Data Report* (IT, 1999b).
- *1998 Interim Removal Action Report* (IT, 1999b): An interim removal action was conducted at the transformer pad in the Boat Dock Nonchannel Area.

A list of documents included in the Administrative Record for HAAF is attached as Appendix A. Portions of the coastal salt marsh were used to support U.S. Army and U.S. Army Reserve operations at HAAF. Activities in the coastal salt marsh included emergency rescue operations in San Pablo Bay, disposal of construction debris, destruction of waste discharge of surface water, and discharge of treated sewage water. Transformers and transformer pads, a winch at the Boat Dock, and a burn pit at the ELCDDA supported these activities.

Additional features of the coastal salt marsh include the ODD, which receives stormwater runoff and drainage from the Main Airfield, and the FSTP Outfall, which received Main Airfield sanitary wastes from the FSTP. Based on historical investigations, the types of contaminants detected at various sites in the coastal salt marsh include:

- TPH-d, TPH-g, and TPH-motor
- Metals
- Dioxins
- VOCs
- SVOCs, including PAHs
- PCBs
- Pesticides

3.1.2 Sites Evaluated in this ROD/RAP

The following sites located in the coastal salt marsh are evaluated in the remainder of this ROD/RAP:

- Antenna Debris Disposal Area
- East Levee Construction Debris Disposal Area
- High Marsh Area
- Historic ODD
- ODD
- Boat Dock
- Area 14
- FSTP Outfall

3.1.3 Background and Nature of Contamination

The following sections provide a description of each coastal salt marsh site and a summary of the types of contaminants (metals, pesticides, TPH, etc.) detected at each site. Remedial actions are presented and evaluated in this ROD/RAP for residual COPCs (FFS COPCs) that were detected above actions goals. More information regarding action goals and FFS COPCs is provided in Subsection 3.2.2. Specific information regarding sample locations and

individual sample results is available in the primary reports cited for each coastal salt marsh site. The location of each site is shown in Figure 3.1-1.

3.1.3.1 Antenna Debris Disposal Area

The Antenna Debris Disposal Area is located along the northern portion of the ODD, north of the Building 35 pump station outfall basin. Apparent debris disposal occurred in two areas, one east of the ODD and one west of the ODD (see Figure 3.1-1). (Figures follow the tables at the end of this section.) Visual inspection of the areas indicates that they contain discarded materials from the former antenna facilities and building materials. The December 2001/January 2002 investigation conducted by USACE found debris to a depth of 8.5 feet bgs in the western area and to a depth of 3 feet bgs in the eastern area. Both areas are currently covered with a growth of native grasses, interspersed with some pickleweed, which is common to the rest of the marsh. This site was identified in the Archive Search Report (USACE, 2003) as ASR Site #15.

The western Antenna Debris Disposal Area was investigated by the Army in 1995 (WCFS, 1996), 1999 (FW, 2000), and in December 2001 and January 2002 (USACE, 2002b). During the 1995 and 1999 investigations, eight soil samples were collected in and near the western area. One of the samples was collected at 2 to 3 feet bgs beneath the western area. The results of these investigations indicate that lead and pesticides are common throughout the western area. Only one of the samples was analyzed for PCBs; they were detected in the sample. No samples were collected from the eastern Antenna Debris Disposal Area during the 1995 or 1999 investigations.

In December 2001 and January 2002, the Army collected soil samples from the eastern area and additional samples from the western area. The objective of the sampling was to investigate the extent of chemicals detected in the previous investigations at the western area and to characterize the eastern area sufficiently to determine the appropriate remedy. Sampling at the eastern and western areas resulted in detections of metals, pesticides, TPH, and PCBs.

Table 3.1-1 lists the FFS COPCs for the Antenna Debris Disposal Area. (The table follows the text of this section.) Concentrations of FFS COPCs detected at this site exceed action goals.

3.1.3.2 East Levee Construction Debris Disposal Area

The ELCDDA is located on the eastern margin of the Main Airfield Parcel in the coastal salt marsh and outboard of the east levee. It is bisected by the eastern boundary of the Main Airfield Parcel and lies primarily in land owned by the SLC (see Figure 3.1-1). The ELCDDA was used, from approximately 1961 onward, primarily for disposal of construction debris. A dirt road runs through the central portion of the ELCDDA. Pickleweed grows up to the edges of the road.

The ELCDDA includes a burn pit, located at the eastern end, which extends out into San Pablo Bay and has a slightly higher elevation than most of the ELCDDA and the coastal salt marsh. The nature and quantity of any wastes burned at the site are unknown, and no waste materials were evident at the surface or in soil samples collected at the site. This site was identified in the Archive Search Report (USACE, 2003) as ASR Site #13.

The ELCDDA was investigated by the Army in 1986 (WCC, 1987); 1990 (ESI, 1993); 1994 (USACE, 1994 and WC, 1994); 1995 (WCFS, 1996); 1997 (IT, 1999a); and December 2001 and January 2002 (USACE, 2002b). During the 1986, 1990, 1994, 1995, and 1997 investigations, trench sampling and soil samples were collected and analyzed. TPH-d, TPH-g, SVOCs, VOCs, PCBs, pesticides, dioxins, and metals have been detected in one or more soil samples from the site.

In December 2001 and January 2002, the Army collected additional soil and sediment samples in the burn pit area and in portions of the ELCDDA adjacent to the Main Airfield Parcel. The objectives of the sampling were: (1) to investigate the extent of known chemicals detected in previous investigations at the burn pit; and (2) to characterize the extent of contamination at an isolated location in the ELCDDA sufficiently to determine the appropriate remedy. Sampling at the ELCDDA indicated the presence of metals.

The FFS COPCs for the ELCDDA are listed in Table 3.1-1.

3.1.3.3 High Marsh Area

As described in Subsection 1.4.5, three primary habitat zones are present in the coastal salt marsh (Low Marsh, Middle Marsh, and High Marsh). The Army has investigated several areas in the Middle Marsh habitat as potential areas of concern. Although the areas are located in the Middle Marsh habitat, these areas are collectively known as (and are referred to in many of the coastal salt marsh investigation and planning documents) the High Marsh Area. To remain consistent with previous documents, the term "High Marsh" or "High Marsh Area" will be used to refer to areas located outboard of the perimeter levee that are not part of another identified site. The majority of the High Marsh Area is on land owned by the SLC. The High Marsh Area is on the portion of the coastal salt marsh plain that is dominated by pickleweed. The area extends from the northern to southern Main Airfield Parcel boundaries and to the east from the levee, nearly to the shoreline of San Pablo Bay. A portion of the High Marsh Area is located in the Main Airfield Parcel (see Figure 3.1-1).

For the purposes of this draft ROD/RAP and the development and evaluation of alternatives, the High Marsh Area has been divided into two subgroups: the area where the wetland restoration project proposes to cut a channel to breach the levee, and the remainder of the High Marsh Area. Samples from the Historic ODD and ODD are not included in the High Marsh Area. They are discussed and evaluated in Subsections 3.1.3.4 and 3.1.3.5, respectively. The FFS COPCs for the High Marsh Area are listed in Table 3.1-1.

Nonchannel Cut Area

The High Marsh Area was investigated by the Army in 1991 and 1992 (ESI, 1993); 1994 (USACE, 1994); 1995 (WCFS, 1996); 1997 (IT, 1999a); 1998 (IT, 1999c); and December 2001 and January 2002 (USACE, 2002b). During the 1991, 1992, 1994, 1995, 1997, and 1998 investigations, sediment samples were collected and analyzed for various constituents in the Nonchannel Cut Area. Various contaminants, including metals and pesticides, have been detected in samples collected in the Nonchannel Cut Area. The area near the pump station outfalls to the bay was identified in the Archive Search Report (USACE, 2003) as ASR Site #16.

In December 2001 and January 2002, the Army collected soil and sediment samples from portions of the Nonchannel Cut Area. The objective of the sampling was to characterize:

- Copper and manganese contamination at a location on the northern end of the High Marsh Area
- Extent of metals contamination (particularly lead) at a cluster of locations on the northern end of the High Marsh Area
- Extent of manganese contamination in the central portion of the High Marsh Area sufficiently to determine the appropriate remedy

Sampling at the High Marsh Nonchannel Cut Area resulted in detections of metals and pesticides.

The FFS COPCs for the Nonchannel Cut Area are listed in Table 3.1-1.

Proposed Channel Cut Area

The High Marsh Area was investigated by the Army in 1991 and 1992 (ESI, 1993); 1994 (USACE, 1994); 1995 (WCFS, 1996); 1997 (IT, 1999a); 1998 (IT, 1999c); and September 2001 (USACE, 2002b). During the 1991, 1992, 1994, 1995, 1997, and 1998 investigations, sediment samples were collected and analyzed for various constituents in the Proposed Channel Cut Area. In 1993, metals were detected above baseline concentration (the cumulative concentration of an analyte present in soil from both natural occurrence and anthropogenic activities that are unrelated to activities conducted at a site). Additionally, PAHs were detected above baseline concentrations at three locations in the Proposed Channel Cut Area. In 1995, metals were detected at all sampled locations in the Proposed Channel Cut Area of the High Marsh. PAHs were detected at one location, and two pesticides (chlordane and DDT) were detected above baseline concentrations at one location in the Proposed Channel Cut Area.

In September 2001, the Army conducted a specific investigation to evaluate the soil in the Proposed Channel Cut Area. Samples were collected at 12 locations and 3 depths (1, 2, and 4 feet bgs). The samples were collected in a grid from the ODD toward the bay where the planned channel cut is anticipated. TPH, metals, PAHs, and SVOCs were detected in samples collected from the Proposed Channel Cut Area.

The FFS COPCs for the Channel Cut Area are listed in Table 3.1-1.

3.1.3.4 Historic Outfall Drainage Ditch

The portion of the ODD now known as the Historic ODD runs from the southern edge of the ELCDDA southward to the northern edge of the runway overrun (see Figure 3.1-1). Concrete building materials are visible along portions of the Historic ODD and were apparently used as riprap. Much of the Historic ODD has filled with sediments throughout the years, although the channel is still visible.

The Army collected two sediment samples in the Historic ODD during the 1995 investigation. Metals, including cadmium, cobalt, lead, and manganese, were present in the samples. The Army investigated the Historic ODD in December 2001. During the investigation, the Army collected soil and sediment samples at 250-foot intervals along the

Historic ODD, in order to characterize the extent of contamination. Some metals and pesticides were detected.

The FFS COPCs for the Historic ODD are listed in Table 3.1-1.

3.1.3.5 Outfall Drainage Ditch

The ODD is located on the coastal salt marsh side of, and parallel to, the east perimeter levee (See Figure 3.1-1). The ditch receives stormwater runoff and drainage from the Inboard Area sites and PDD. Historically, the ODD ran from the northernmost portion of the Main Airfield Parcel south to the Historic ODD, which emptied into the Boat Dock channel. The ODD receives water from the airfield stormwater collection system. The water is discharged to the ODD from the pump house area. When the south runway extension was constructed in 1953, the northern portion of the ditch was rerouted to San Pablo Bay at a point near the northern edge of the ELCDDA. Currently, the ODD runs from the northernmost portion of the Main Airfield Parcel to the northern edge of the ELCDDA. From this point, the ditch makes a 90-degree turn and runs to its discharge point in San Pablo Bay. The ODD is 3 to 4 feet deep and 6 to 10 feet wide.

The ODD was investigated by the Army in 1990 and 1991 (ESI, 1993); 1994 (USACE, 1994); 1995 (WCFS, 1996); 1997 (IT, 1999a); 1998 and 1999 (IT, 1999b); and January 2002 (USACE, 2001b). During the 1990, 1991, 1994, 1995, 1997, 1998, and 1999 investigations, sediment samples were collected and analyzed for various constituents in the ODD. TPH, metals, PCBs, and pesticides were detected in sediment samples collected from the ODD. Specifically, in 1994, metals, total recoverable petroleum hydrocarbon (TRPH), and TPH-d were detected above baseline concentrations in the Building 41 pump station outfall area.

In January 2002, the Army collected sediment samples from the ODD. The objectives of the sampling were: (1) to investigate the extent of chemicals detected in the previous investigations at the outfalls; (2) to address the downstream extent of contamination from the outfalls; and (3) to characterize the portion of the ODD upstream of the outfalls sufficiently to determine the appropriate remedy. Sampling at the ODD resulted in detections of metals, TPH, and pesticides.

The FFS COPCs for the ODD are listed in Table 3.1-1.

3.1.3.6 Boat Dock

For purposes of this draft ROD/RAP, the Boat Dock was divided into two areas, the Nonchannel Area and the Channel Area.

Nonchannel Area

The Boat Dock is located at the southeast corner of the HAAF Main Airfield Parcel in the coastal salt marsh (see Figure 3.1-1). Before 1965, when the base was active, the launch was maintained at the dock for rescue in the event of an emergency in San Pablo Bay. The Boat Dock had electrical power supplied by two transformers and one or more small, enclosed structures. A gasoline-powered winch was used to lower the launch down a steel track into a dredged channel and turning basin. The facility has since been abandoned and only piers and the main platforms remain.

The Nonchannel Area was investigated by the Army in 1997 (IT, 1999a), 1998 (IT, 1999c), and 1999 (FW, 2000). During these investigations, soil samples were collected and analyzed for various constituents in the Nonchannel Area. PCBs were detected in soil samples collected at the transformer pad area. Metals and pesticides were present in soil samples collected around and beneath the deck structures. PAHs were also detected, but are likely attributable to the creosote in pier pilings.

Investigations during the Comprehensive RI (IT, 1999a) and the remedial design investigation (FW, 2000) characterized the contamination present at the Nonchannel Area. An interim removal action was conducted in 1998 at the transformer pad in the Nonchannel Area, where one or more soil samples contained PCBs at concentrations at or above guidance levels (IT, 1997c). The interim removal action involved the removal of approximately 24 cubic yards of affected soil at the transformer pad, with offsite disposal of the excavated soil and the removal of the transformer pad (IT, 1999c). After excavation, five confirmation soil samples were collected to ensure the achievement of interim removal action guidance levels (concentrations of specific contaminants used to establish excavation limits during interim removal actions). PCBs were not detected in the confirmation samples. After completion of confirmation sampling, soil from a borrow area in the Main Airfield was used to backfill the excavation. Table C1-1.1 of the Comprehensive RI (IT, 1999a) presented the analytical results for the borrow area soil. All chemical concentrations reported for the borrow material are less than the action goals for the coastal salt marsh.

The FFS COPCs for the Boat Dock Nonchannel Area are listed in Table 3.1-1.

Channel Area

The Channel Area extends west from San Pablo Bay to the launch ramp at the Boat Dock, where it bends and continues to extend south to adjacent agricultural land. This portion of the Channel Area received agricultural runoff and stormwater from the Airfield. Aerial photographs suggest that maintenance of the channel and turnaround areas for the dock was discontinued during the 1960s. Because maintenance has stopped, the original contours of the channel leading from the dock to the bay have changed dramatically, as a result of the deposits of silt from San Pablo Bay. Historical photos indicate that the original channel was more than 100 feet wide. The historical depth of the channel is unknown. The turnaround area could accommodate boats up to 40 feet long. Currently, the existing channel is approximately 15 feet wide. The turnaround area is virtually nonexistent and is covered with a dense growth of pickleweed. The channel in this area receives some runoff from the Las Gallinas Valley Sanitary District gray water spraying operation.

The Channel Area was investigated by the Army in 1999 (FW, 2000) and December 2001 (USACE, 2002b). A single sediment sample was collected from the Boat Dock channel surface. The sample contained pesticides, herbicides, PAHs, TPH, VOCs, and metals. In December 2001, the Army collected additional sediment samples from the Channel Area. The objective of the sampling was to ascertain the extent of contamination found at the Boat Dock sufficiently to determine the appropriate remedy. Sampling at the Channel Area indicated the presence of metals.

The FFS COPCs for the Boat Dock Channel Area are listed in Table 3.1-1.

3.1.3.7 Area 14

Area 14 was a barren (or possibly inundated) area identified in a 1941 aerial photograph. The area is located north of the Boat Dock, just east of the east levee (see Figure 3.1-1). This site was identified in the Archive Search Report (USACE, 2003) as ASR Site #14.

The Army investigated area 14 in December 2001 and January 2002. During the investigation, the Army collected soil and sediment samples from Area 14 on a 100-foot grid. The objective of the sampling was to characterize the portions of Area 14 that were not covered with the construction of the runway overrun. Sampling at Area 14 resulted in detections of metals, pesticides, TPH, and PAHs. No debris or rubble, other than the rock and gravel used to support the runway extension and the road, was encountered.

The FFS COPCs for Area 14 are listed in Table 3.1-1.

3.1.3.8 Former Sewage Treatment Plant Outfall

The discharge point of the FSTP is located southeast of the Pump Station Area in the coastal salt marsh. Until 1986, treated effluent water was discharged into San Pablo Bay via the FSTP Outfall Pipe. Now abandoned, this outfall pipe extends approximately 450 feet eastward from the levee into the coastal salt marsh (see Figure 3.1-1). The terminus of the outfall pipeline is near the edge of the vegetated portion of the coastal salt marsh. There is a small outfall basin, and a narrow channel that conveyed the discharge from the pipe across the remainder of the marsh and the unvegetated intertidal mudflats to the open water of San Pablo Bay.

The FSTP Outfall was investigated by the Army in 1991 (ESI, 1993); 1995 (WCFS, 1996); and December 2001 and January 2002 (USACE, 2002b). A sediment sample was collected in the 1991 investigation 50 feet beyond the terminus of the outfall pipe in the channel to assess the contamination of sediments in San Pablo Bay. The sediment sample results showed no elevated concentrations of metals when compared with local background sediment concentrations estimated by ESI. However, elevated levels of mercury were detected at the surface. A sediment sample was collected during the 1995 investigation from the outfall basin. The sediment sample contained metals (including mercury), SVOCs, and PAHs.

In December 2001 and January 2002, the Army collected additional soil and sediment samples from the FSTP Outfall. The objective of the sampling was to investigate the extent of mercury detected in a previous investigation sufficiently to determine the appropriate remedy.

The FFS COPCs for the FSTP Outfall are listed in Table 3.1-1.

TABLE 3.1-1
Coastal Salt Marsh Site Specific COPCs

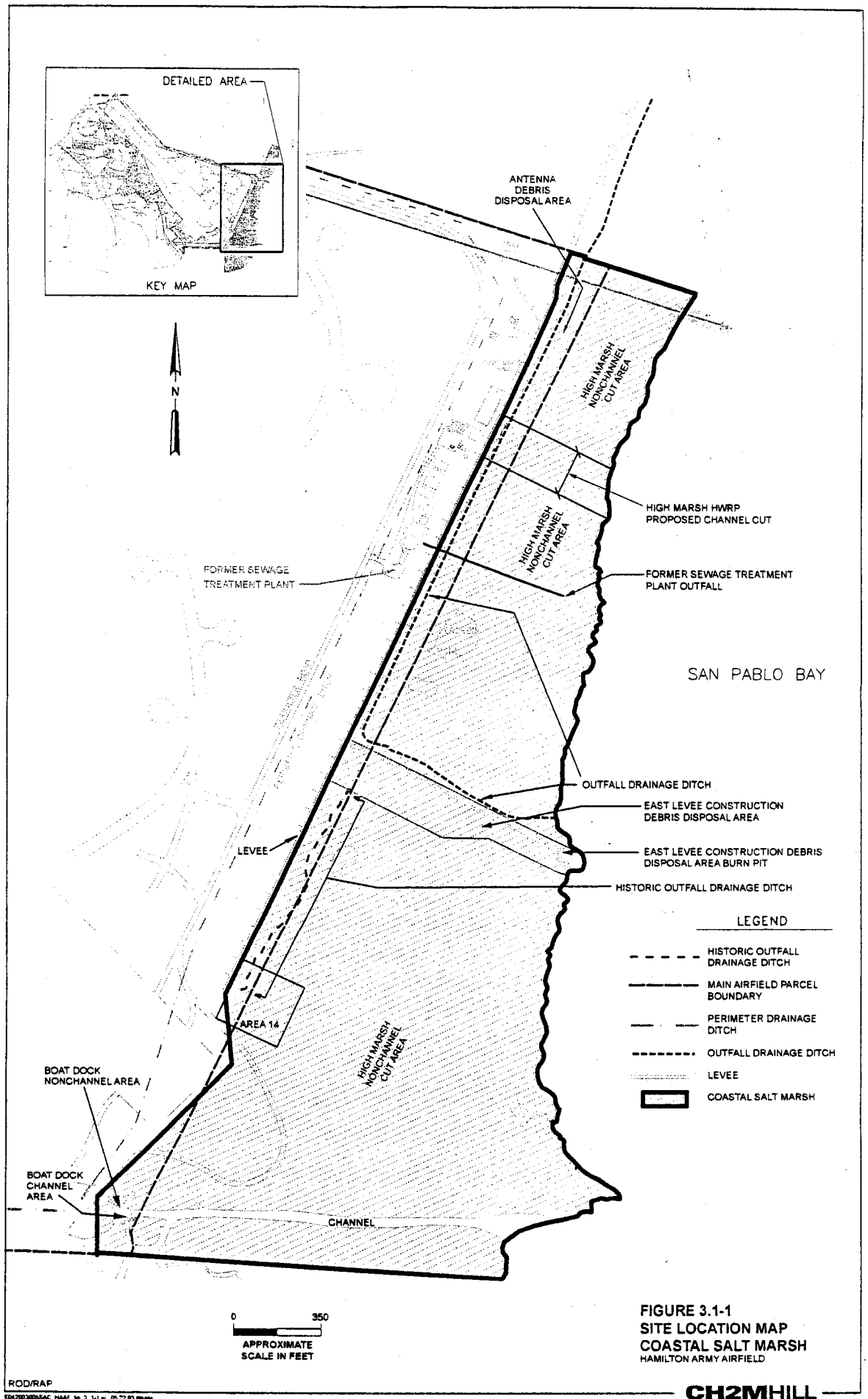
Contaminants	Action Goals	Antenna Debris Disposal Area	East Levee Construction Debris Disposal Area	High Marsh Nonchannel Cut	High Marsh Proposed Channel Cut	Historic Outfall Drainage Ditch	Outfall Drainage Ditch	Boat Dock Nonchannel Area	Boat Dock Channel	FSTP Area	Outfall 14
Metals											
Arsenic	188	X									
Barium	188	X									
Beryllium	188										
Boron	71.6										
Cadmium	149										
Chromium	149										
Cobalt	88.7	X									
Copper	88.7	X									
Lead	167										
Manganese	1260	X									
Mercury	10.53										
Nickel	132	X									
Silver	136										
Vanadium	136										
Zinc	136										
Semivolatile Organic Compounds (Including PAHs)											
PAHs Total	0.022										
Pentachlorophenol	0.017										
Phenol	10.13										
Petroleum Hydrocarbons											
TPH-diesel	144										
TPH-gasoline/TPH-JP-4	12										

TABLE 3.1-1
Coastal Salt Marsh Site Specific COPCs

Contaminants	Action Goals	Antenna Debris Disposal Area	East Levee Construction Debris Disposal Area	High Marsh Nonchannel Cut	High Marsh Proposed Channel Cut	Historic Outfall Drainage Ditch	Outfall Drainage Ditch	Boat Dock Nonchannel Area	Boat Dock Area Channel	FSTP Outfall
Pesticides/PCBs/Dioxins										
BHCs, total	0.0045	X						X		
Chlordanes, total	0.00479	X		X	X		X	X		X
DDEs, total (a)	0.001	X	X	X	X		X	X	X	X
Dichlorprop	0.14					X				
Endrin aldehyde	0.004	X		X	X		X			
Heptachlor	0.0088	X								
Heptachlor epoxide	0.0038	X						X		
MCPA	7.9	X								
MOPP	0.0	X								
Methoxychlor	0.09							X		
PCBs, total	0.09	X	X	X	X		X			
Total TCDD TEQ	0.000021		X							

FSTP = Former Sewage Treatment Plant

X = Contaminant identified as COC at site.



Overview of Risk Assessment and Action Goals

This section provides an overview of the risk assessment and the process used to establish action goals for the coastal salt marsh sites. Contamination at most of the sites was first evaluated in the risk assessment to make an initial determination of the COPCs, and the levels that pose a risk. The sites were further evaluated in the FFS based on action goals and additional data that had been collected after completion of the risk assessment. The FFS determined which sites would require further action. The following text describes the process used to arrive at these decisions.

3.2.1 Risk Assessment Overview

The Army prepared a baseline risk assessment for coastal salt marsh sites, including the High Marsh, ELCDDA, Boat Dock, ODD, and Antenna Debris Disposal Area (USACE, 2001). Samples collected from the Historic ODD and FSTP Outfall were included in the evaluation of the High Marsh. The overall objective of the risk assessment was to assess the potential for adverse impacts to human health and the environment resulting from the exposure of receptors to contaminants in soil and sediment associated with historical activities in the coastal salt marsh (USACE, 2001).

Current and future land use scenarios were used to assess potential human health risks associated with the coastal salt marsh sites. Recreational use of the coastal salt marsh (or estuary) was the only exposure scenario considered for current and future land at the sites because no significant change in the habitat is anticipated. During the HHHERA, the receptors considered for each coastal salt marsh site included marsh recreational users and consumers of recreationally caught fish and shellfish. Given the high certainty associated with future habitat at the coastal salt marsh sites, the ecological risk assessment considered only estuarine biota to characterize risk at these sites.

The HHHERA evaluated numerous human health and ecological COPCs and identified COCs. COPCs are chemicals that are identified and evaluated during the risk assessment process because they are specifically related to activities conducted at the site and have the potential to adversely affect human health and/or the environment. COCs are COPCs that were evaluated during the risk assessment and determined to pose unacceptable risk to human health and/or the environment. The COCs identified during the HHHERA are presented in Appendix B of the FFS (CH2M HILL, 2003).

3.2.2 Action Goals

The objective of this ROD/RAP is to remove contaminated soils to the maximum extent practical to protect public health and to maintain its wetland function. If any contaminants remaining above action goals are still a concern within the excavated areas, the site will be backfilled to prevent direct exposure to these contaminants. To achieve this objective, action

goals protective of wetland receptors (including sensitive species) are established in this document. The action goals for the coastal salt marsh sites are provided in Table 3.2-1. Numerical values for each action goal are set for various contaminants found at the coastal salt marsh sites. However, action goals apply only to specific contaminants at each site, because the COPCs differ between sites. Table 3.2-1 shows the specific COPCs at each site and the corresponding action goal. The following text describes the process for selecting specific COPCs at the coastal salt marsh sites and the sources for the action goals.

Action goals for the coastal salt marsh sites were established by evaluating the results of the risk assessment along with data collected at the sites following completion of the risk assessment. This process was completed during the FFS and is summarized below.

COPCs for each site were established during the FFS (CH2M HILL, 2003). The FFS considered data evaluated in the risk assessment in addition to data that the Army collected in 2001/2002 following the completion of the risk assessment. The FFS used a statistical approach to calculate the 95th UCL for each contaminant detected at a site. If the 95th UCL for a contaminant at a site was greater than the action goal, then the contaminant was determined to be a FFS COPC. The maximum detections at a site were used for comparison if fewer than 5 samples were collected at a site. This process differs somewhat from the process used for the Inboard Area sites. For the coastal salt marsh sites, each contaminant detected was compared to the action goals without first determining whether the contaminant posed a risk to human health or the environment. The approach is described in more detail in the FFS (CH2M HILL, 2003) and was applied only to sites in the coastal salt marsh where additional sampling had been conducted following the completion of the risk assessment. This approach was used because the risk assessment could not consider data that had been collected following its completion.

Using the approach described, the FFS identified FFS COPCs as contaminants that should be compared to action goals at each coastal salt marsh site (see Table 3.1-1). Detections of these FFS COPCs above action goals are evaluated for remedial actions in this ROD/RAP.

The action goals selected in this ROD/RAP are based on a number of references (see Table 3.2-1). For metals, the primary references are published site-specific ambient concentrations. For SVOCs, including PAHs, the references are the ER-L and values from the risk assessment. Petroleum hydrocarbon action goals are based on the Presidio of San Francisco Saltwater Ecological Protective Zone. Action goals for PCBs and dioxins are derived from the risk assessment. The DDT values were developed in the FFS (CH2M HILL, 2003).

TABLE 3.2-1
Action Goals – Coastal Salt Marsh Sites
Hamilton Main Airfield Parcel ROD/RAP

Contaminant	Action Goals (ppm) ^a	Source ^b
Metals		
Arsenic	23	Site-Specific Sediment Ambient
Barium	188	Site-Specific Sediment Ambient
Beryllium	1.68	Site-Specific Sediment Ambient
Boron	71.6	Site-Specific Sediment Ambient
Cadmium	1.8	Site-Specific Sediment Ambient
Chromium	149	Site-Specific Sediment Ambient
Cobalt	26.7	Site-Specific Sediment Ambient
Copper	88.7	Site-Specific Sediment Ambient
Lead	46.7	ER-L
Manganese	1260	Site-Specific Sediment Ambient
Mercury	0.58	Site-Specific Sediment Ambient
Nickel	132	Site-Specific Sediment Ambient
Silver	1	ER-L
Vanadium	136	Site-Specific Sediment Ambient
Zinc	169	Site-Specific Sediment Ambient
Semivolatile Organic Compounds (including PAHs)		
PAHs, total	4.022	ER-L
Pentachlorophenol	0.017	HHERA—Marine Invertebrate
Phenol	0.13	HHERA—Marine Invertebrate
Petroleum Hydrocarbons		
TPH-d/TPH-motor oil ^c	144	Presidio—Saltwater Ecological Protective Zone
TPH-g/JP-4	12	Presidio—Saltwater Ecological Protective Zone
Pesticides/Herbicides/PCBs/Dioxins		
BHCs, total	0.0048	Lindane AET (polychaete)
Chlordanes, total	0.00479	PEL
DDTs, total ^d	0.03	RART—California clapper rail
Dichlorprop	0.14	HHERA—California clapper rail
Endrin Aldehyde	0.0064 ^e	HHERA—Marine Invertebrate
Heptachlor	0.0088 ^f	HHERA—Marine Invertebrate
Heptachlor epoxide	0.0088	HHERA—Marine Invertebrate
MCPA	7.9 ^g	HHERA—Marine Invertebrate
MCPP	3.0	PQL

TABLE 3.2-1
Action Goals – Coastal Salt Marsh Sites
Hamilton Main Airfield Parcel ROD/RAP

Contaminant	Action Goals (ppm) ^a	Source ^b
Methoxychlor	0.09	HHERA—Marine Invertebrate
PCBs, total	0.09	HHERA—California clapper rail
Dioxins (Total TCDD TEQ) ^h	0.000021	EPA

NOTE: This is a comprehensive list of action goals. All action goals do not apply at each site.

TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalence

^a If contamination above the action goals is found in the coastal salt marsh beyond those areas already identified as requiring remediation, the Army and State will determine whether additional or continued excavation is warranted by considering the potential risk to public health and the environment from the residual contaminants and the resulting habitat destruction.

^b The sources of the action goals are:

- **Metals:** Background concentrations for metals were primarily used as action goals unless the background concentrations were less than available risk-based numbers. Site-specific ambient levels from Appendix A - U.S. Army, 2001, *Final Human Health and Ecological Risk Assessment*, Effects Range-Lows (ER-Ls) from Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder, 1995, "Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments," *Environmental Management*, 19:81-97; *San Francisco Bay RWQCB Staff Report: Ambient Concentrations of Toxic Chemicals in San Francisco Bay Sediments*, May 1998.
- **Petroleum hydrocarbons:** *Report of Petroleum Hydrocarbon Bioassay and Point-of-Compliance Concentration Determinations; Saltwater Ecological Protection Zone; Presidio of San Francisco, California*, Dated December 1997. The numbers in this report were developed for a similar site with similar ecological receptors.
- **PAHs:** ER-Ls from Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder, 1995, "Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments," *Environmental Management*, 19:81-97. The ER-Ls were used as action goals because the ER-Ls are accepted as being protective of ecological receptors.
- **SVOCs:** US Army, 2001, *Final Human Health and Ecological Risk Assessment*.
- **Pesticides, Herbicides, PCBs, and Dioxins:** Table 5-1 from the US Army, 2001, *Final Human Health and Ecological Risk Assessment* (marine invertebrate-amphipod and California clapper rail); practical quantitation limits (PQLs) from previous sampling events were used when no other ecologically-based numbers were available with achievable detection limits; U.S. EPA, 1993a, *Interim Report on Data and Methods for Assessment of 2,3,7,8-Tetrachlorodibenzo-p-dioxin Risks to Aquatic Life and Associated Wildlife*. (EPA/600/R-93/055); for lindane and total chlordanes, Screening Quick Reference Tables (SQuiRTs), NOAA, updated September 1999 were used as the best available ecological number when no other references were available. The DDT values were developed in the Coastal Salt Marsh Focused Feasibility Study (CH2M HILL, 2003).

^c The action goal for TPH diesel/TPH motor oil is also used as the action goal for UHE (unknown hydrocarbons extractable).

^d The total DDT concentration in the Coastal Salt Marsh Area or Inboard Area shall not exceed 1.0 ppm. Areas with total DDT concentrations greater than 1.0 ppm shall be excavated and disposed of offsite.

^e The goal for Endrin Ketone is used as a surrogate for Endrin Aldehyde.

^f The goal for Heptachlor Epoxide is used as a surrogate for Heptachlor.

^g The goal for 2,4,D is used as a surrogate for MCPA.

^h Dioxin is only considered a COC at the ELCDDA Burn Pit.